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: Conroy

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February 9, 1994

TO: Supervisor Conroy

FROM: Budget Analyst

SUBJECT: Cost of Chlorine versus Sodium Hypo-Chlorite in Sewage Treatment

Pursuant to your request, the following information is provided about the cost of using chlorine in San Francisco's sewage treatment facilities as opposed to sodium hypo-chlorite, which is currently being used.

Cost of Sodium Hypo-Chlorite

San Francisco's Clean Water Enterprise uses approximately 4,469 tons of sodium hypo-chlorite (liquid bleach) annually to treat San Francisco's sewage at a cost of $3,072,828 in FY 1993-94 or $687.59 per ton.

Cost of Liquid Chlorine

According to the Purchasing Department, an equivalent amount of liquid chlorine costs approximately $385 per ton or approximately 44 percent less than sodium hypo-chlorite.

Why the Clean Water Enterprise Uses Sodium Hypo-Chlorite Instead of Chlorine

Prior to 1978, the San Francisco Clean Water Program used liquid chlorine to treat wastewater. The liquid chlorine was stored in large pressurized containers. The gas from the liquid chlorine was drawn off to disinfect the wastewater. A reducing agent, sulfur dioxide, was then used to eliminate any residual chlorine before the wastewater was discharged into the Bay or ocean. According to the Water Treatment Plant Manager, liquid chlorine is the least expensive form of wastewater treatment. However, liquid chlorine poses a potential hazard to the public if there is

a spill or leak that can happen during its transportation, handling, storage and use. If liquid chlorine spills or leaks, a toxic gas cloud would be released over the general area of the leak, causing a life-threatening toxic hazard. There were several incidents throughout the country of chlorine gas leaks that killed and injured people during 1978. As a result, in 1978, the Board of Supervisors adopted a policy (Resolution 796-78) to cease the use of chlorine as a disinfectant and sulfur dioxide as a reducing agent in the City's wastewater processing facilities and requested that the Chief Administrative Officer (CAO) implement a cost-effective alternate wastewater disinfectant and reducing agent. The Clean Water Program chose to use the less dangerous sodium hypo-chlorite as a disinfectant and sodium bisophite as a reducing agent in wastewater treatment.

Sodium hypo-chlorite may also pose some danger to the public, but the extent of that danger is much less severe than that posed by chlorine. According to Ms. Caroline Jones, DPW's Health and Safety Officer, because sodium hypo-chlorite is a liquid, a leak would evaporate slowly and would therefore be relatively easy to contain. Ms. Jones advises that using sodium hypo-chlorite does not present the risk of a toxic gas cloud being released over the City as there would be if the Clean Water Program used liquid chlorine.

Mr. Bill Keany of the DPW reports that, to switch back to using liquid chlorine the Department would need to make significant infrastructure improvements to wastewater treatment plants, such as railroad siding and equipment to feed and install chlorine gas. These capital improvements are required because a chlorine feeder system is significantly different from a sodium hydro-chlorite feeder system. Mr. Keany reports that such capital improvements could cost the City several million dollars. In addition, the staff at the treatment plants would need to receive additional hazardous material training in handling liquid chlorine. Finally, using liquid chlorine poses a general risk to City residents and, as such, poses an additional liability to the City.

According to Mr. Todd Cockburn of the DPW, the Clean Water Enterprise Program is moving away from using chemicals in wastewater treatment. Mr. Cockburn advises that most chemicals used in wastewater treatment have negative environmental side effects. Mr. Cockburn also reports that the Environmental Protection Agency (EPA) and the San Francisco Regional Water Quality Control Board (RWQCB) have been encouraging the Clean Water Enterprise Program to discontinue its use of all chemicals in wastewater treatment. In response to these regulatory requests, the Clean Water Enterprise Program is evaluating the use of ultra violet light in sewage treatment.

To use ultra violet light, the Clean Water Program would need to install thousands of large ultra violet light tubes throughout the wastewater treatment system. Mr. John Loiacono of the DPW reports that the capital and operating costs to use ultra violet lights depends on the level of treatment required by the RWQCB. If the RWQCB requires the highest level of treatment, Mr. Loiacono reports that the capital costs to install ultra violet lights would be approximately $12 million and the annual cost to operate and maintain these lights would be approximately $1,190,000. The annual cost to operate and maintain the use of hypo-chlorite in sewage treatment is $1.7 million or $510,000 more than the cost to operate and maintain the highest level of use of ultra violet light. Thus, the major cost to the City to use ultra violet light in sewage treatment would be the initial capital expenditures.

Conclusion

The potential savings of approximately $1,352,263 annually from using liquid chlorine instead of sodium hypo-chlorine would be offset by capital spending requirements and an increased risk to City residents. Further, the use of chlorine would be contrary to the Clean Water Program's current plan to cease the use of chemicals in sewage treatment altogether.

Harvey M. Rose

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